Repair Station Research Status Report

The following report represents RE&D involvement in the Flight Standards Repair Station Program. The following pages will present a brief explanation of each work item.

Work Item 1. Outsourcing Decisions in Aircraft Maintenance -- This work item was a grant with Northwestern University, which involved identifying the best practices of air carriers (foreign and domestic) in the area of [maintenance] outsourcing. The grantee reviewed/assessed:

- What criteria do airlines use to choose a contracted maintenance facility for a contract?
- What data do airlines currently collect?
- What information would airlines like to have about repair station?
- How do airlines rate the work performance of contracted repair stations?

Product: Technical Report on Outsourcing Decisions in Aircraft Maintenance

Status: This work item is deemed complete as the FAA accepted the technical report on January 28, 2000. The report will be used as input into the Repair Station Data Requirements Initiative. Follow-on effort is entitled **Evaluate Domino Effects of Contract Maintenance.**

Work Item 2. Evaluate Domino Effects of Contract Maintenance -- This work item involves evaluating the effects of the practice by repair stations of subcontracting work out to other certificate or noncertificated facilities.

- How frequent is this practice?
- How many levels of subcontracting can there be?
- Is there an oversight or safety implication to the business practice?

Status: This work item began on January 31, 2000. The product from this work item is a technical report scheduled for acceptance by the FAA on or about January 31, 2001. The report will be used as input into the **System Safety/Oversight Information Requirements Work Item.**

Work Item 3. Definition of Substantial Work - This work item involved coming up with a clear definition of what constitutes "substantial maintenance" at a repair station.

Product: Technical Memorandum on the Definition of Substantial Work

Status: This work item is deemed complete as the FAA accepted the technical memorandum on November 29, 1999. The memorandum will be used as input into the **Identification of Risk Factors Work Item.**

Work Item 4. Evaluate the Growth Bulletin – This work item involved evaluating the growth bulletin (HBA W 98-21).

Product: Technical Memorandum on the Growth Bulletin as related to Repair Station

Status: This work item is deemed complete as the FAA accepted the technical memorandum on November 29, 1999. The memorandum will be used as input into the **Identification of Risk Factors Work Item.**

Work Item 5. Assess/Evaluate Enforcement Information System (EIS) Data – This work item involves the assessment of EIS data. Factors to consider in this analysis include the following:

- Inspector focus (what FAR part(s) were cited?)
- Trends and Patterns

- Whether the repair station is foreign or domestic
- Sanctions

Status: This work item began on October 1, 1999 and is ongoing; results to be shown at the July 2000 Repair Station Expert Panel. The findings/results will be used as input into the **Development of the Prototype EIS Event PM/Profile Section Work Item and the Identification of Risk Factors Work Item.**

Work Item 6. SAGA Project Plan - This work item develops a plan to implement a systems safety approach for general aviation.

Status: This work item began on March 8, 2000. The Technical Memorandum from this work item is expected to be completed on September 30, 2000; this memo will be used as input into its compatibility with SPAS.

Work Item 7. SAGA Requirements - This technical report entails the identification and prioritization of those segments of general aviation suitable to a systems safety approach.

Status: This work item began on January 17, 2000 and is ongoing; this report is slated for completion on March 30, 2001.

Work Item 8. Review of Industry Standards – This work item involves review of ISO-9002, AS-9000 and comparing them with the Joint Aviation Authority (JAA) processes and in particular the Joint Aviation Regulations (JARs).

Status: This work item began on October 1, 1999 and is ongoing; this memorandum is expected to be completed on August 31, 2000. **This work item will provide input into the development of the Risk Model and also input to the System Safety/Oversight Information Requirements Work Item.**

Work Item 9. Assess/Evaluate International Data Sources – This work item involves an assessment of the information collected by International Civil Aviation Organization (ICAO), JAA, Transport Canada and European Aviation Safety Authority (EASA).

Status: This work item began on November 1, 1999 and is ongoing; this memorandum is slated for completion on March 30, 2001. **Also may feed into the System Safety/Oversight Information Requirements Work Item.**

Work Item 10. Investigate Potential New Data Sources – This work item involves a survey of aviation related internet/intranet sites to identify potential new data sources. This effort will help to gain a better understanding of what decisions are made by Aviation Safety Inspectors (ASIs), Region and Headquarter (HQ) Aviation Flight Standards (AFS).

Status: This work item began on November 1, 1999 and is ongoing; March 31, 2001 is the expected completion date of this memorandum. **This work item will provide input into the Repair Station Forecasting and Risk Model.**

Work Item 11. Conduct impact of Related Entities – This work item involves identifying the different types of entity that relate to repair stations, and assessing the impact of that relationship. The entities include
Foreign Repair stations (incl. those not certificated by FAA)

- Duty Alteration Station (DAS)
- Canadian Aircraft Maintenance Organizations (AMOs)
- Federal Aviation Regulation (FAR) 121 and Special Federal Aviation Regulation (SFAR) 36 locations
- Designated Engineering Representatives (DERs), Designated Airworthiness Representatives (DARs), Organizational Designated Airworthiness Representatives (ODARs)

Status: This work item began on October 1, 1999 and is ongoing; this memorandum is expected to be completed on March 31, 2001. **This Work Item will provide input into the Repair Station Risk and Forecasting Model. Also may feed into the System Safety/Oversight Information Requirements Work Item.**

Work Item 12. Identify and Assess Manufactures & Other Related Entities – This work item involves identifying manufacturing organizations and data systems that relate to repair stations, and assessing the impact of that relationship.

Status: This work item began on November 1, 1999 and is ongoing; this memorandum is expected to be completed on March 31, 2001. **This work item will provide input into the PTRS/FAR-145, Repair Station Risk and Forecasting Model.**

Work Item 13. Conduct System Safety/Oversight Information Requirements Work Item – This work item involves developing methods to identify the information needs of AFS personnel in providing the required oversight of certificated repair stations. Emphasis will be given to:

- System Safety businesses approaches that AFS is embracing
- Review of 8300.10 for guidance on repair station inspections
- Eliciting information needs from the inspector population

Status: This work item began October 1, 1999 and is ongoing; this technical memorandum is slated for completion on February 28, 2001. **This memorandum will be used as input into the identification of Risk Factors Work Item and other candidate performance measures/risk indicators.**

Work Item 14. Identification of Risk Factors – This work item involves identifying potential risks associated with repair Stations. For example, the criticality of the work performed by the repair station, whether it performs substantial maintenance, and whether it shows signs of stress as described in the growth bulletin.

Status: This work item began October 1, 1999 and is ongoing; this memorandum is expected to be completed on September 30, 2000. **This Work Item will provide input into the development of the Repair Station Risk and Forecasting Model.**

Work Item 15. Criticality of Ratings - This work item involves reviewing the set of repair station ratings and assigning weighted values to each rating.

Status: This work item began on October 1, 1999 and is ongoing; specifications are expected to be completed by September 30, 2000. **This work item will provide input into the Repair Station Forecasting Model.**

Work Item 16. Evaluate Information on Suspected Unapproved Parts – This work item involves looking at program Tracking Reporting Subsystem (PTRS) and Parts Reporting System (PRS) to assess what information related to unapproved parts could support risk assessment of repair stations.

Status: This work item began on October 1, 1999 and is ongoing; this technical memorandum is expected to be completed on June 30,2000. **This work item will provide input into the PRS Performance Measure.**

Work Item 17. Develop Prototype of Investigation Performance Measure – This work item entails the development of a performance measure that is primarily based on PRS and EIS data.

Status: This work item began on January 17, 2000 and is ongoing; this prototype is expected to be completed by March 30, 2001. **Development of the Investigation PM Work Item will provide input into the Repair Station Risk and Forecasting Model.**

Work Item 18. Develop Prototype of Complexity PM - This work item develops a performance measure that takes into account the criticality of the work performed by the repair station, whether it performs substantial maintenance, the number of operators it provides support to, sub-contracting, the number of employees including certificated repairmen.

Status: This work item began on January 17, 2000 and is ongoing; this prototype is expected to be completed by March 30, 2001. **Development of the Complexity PM Work Item will provide input into the Repair Station Risk and Forecasting Model.**

Work Item 19. Develop Prototype of Stability Performance Measure – This work item entails the development of a performance measure that is primarily based on changes in key VIS data fields, e.g. key personnel, ratings, and technical personnel. Any bankruptcy and legal action will also be captured in this PM.

Status: This work item began on January 17, 2000 and is ongoing; this prototype is expected to be completed by September 29, 2000. **Development of the Stability PM Work Item will provide input into the Repair Station Risk and Forecasting Model.**

Work Item 20. Develop Prototype of Oversight PM - This work item develops a performance measure that takes into account the FAA surveillance results (emphasis on Long Term Surveillance Trend PM), any IASA ratings, JAA actions, and foreign repair station renewal activity.

Status: This work item began on January 17, 2000 and is ongoing; this prototype is expected to be completed by March 30, 2001. **Development of the oversight PM Work Item will provide input into the Repair Station Risk and Forecasting Model.**

Work Item 21. Develop Repair Station Risk Model - This work items will use the research findings from the previous four work items (#17-#20). A weighing scheme will be developed. The concept is to develop a model that will automatically generate (on a monthly basis) a risk value to each FAR-145 certificate holder.

Status: This work item will begin on October 1, 2000; this prototype is expected to be completed by April 27, 2001.

Work Item 22. Develop Repair Station Forecasting Model - Under this work item, a non-homogeneous Poisson process model /forecasting model will be developed that uses the most recent surveillance results in determining repair stations that are most likely in need of attention.

Status: This work item began on April 1, 1999; this prototype is expected to be completed by April 27, 2001.

Work Item 23. Production Versions of Repair Station Models, Indicators and Performance Measures - This work item provides R,E&D funds to assist in the development of production versions of the Repair Station models, indicators, and PMs. Development and implementation will include:
–Final Specifications
–Programming
–Test & Evaluation

Status: This work item will begin on June 1, 2001 and will be completed by September 30, 2001.

Work Item 24. Develop PTRS/FAR-145 Mockup – This work item will develop a mockup of PTRS/FAR-145 data based on the recommendations of the FAR-145 Task Force.

Status: This work item began on October 1, 1999 and is ongoing; this mockup is expected to be completed on July 28, 2000. **This Mockup will provide input into the development of the PTRS/FAR-145 Prototype. May be used as a means for validating some of the recommendations from the System Safety/Oversight Information Requirements Work Item.**

Work Item 25. Develop PTRS/FAR-145 Prototype – This prototype will develop a performance measure, based on PTRS data, using the results of the mockup and the recommendations of the FAR-145 Task Report.

Status: This work item will begin on October 2, 2000; the prototype will be developed by June 30, 2001. **The prototype will provide input into the Repair Station Risk and Forecasting Model.**

Work Item 26. Acquire FSAS Data - This work item involves the acquisition of the Flight Standards Automation System Data. The data primarily is focused on:
–PTRS
–Vital Information System (VIS)
–Automated OPS Specs

Status: This effort began on October 1, 1999 and will continue through September 30, 2001.

Work Item 27. Prepare Appropriate Guidance, Materials and Supporting Analysis and Documentation - As required, this work item will ensure that the final products have sufficient documentation and supporting analysis to ensure maintenance. This effort will assist in interpretation and maintenance of developed models, tools, PMs and indicators.

Status: This work item will begin on October 1, 2000 and is expected to be completed on December 31, 2001.

Work Item 28. Coordinate with Human Factors Activities – This ongoing work item involves a survey of human factors in aviation maintenance. This work item will be coordinated with FAA/Aviation Medicine on status and findings regarding ongoing (and recently completed) human factor studies on aviation maintenance.

Status: This work item is ongoing.